

# Resistance to *Aphanomyces euteiches* infection in wild lentil species



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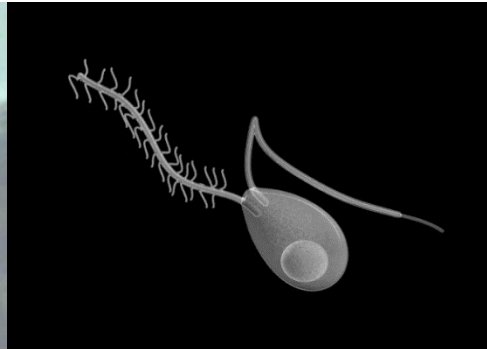
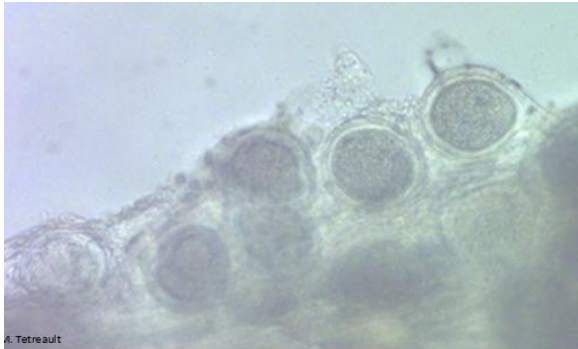
# Root rot in lentil

- *Fusarium* spp. *Pythium* spp., *Rhizoctonia* spp.
  - wide host range and distribution
- *Aphanomyces euteiches*
  - lentil and pea are highly susceptible



# *Aphanomyces euteiches* in lentil

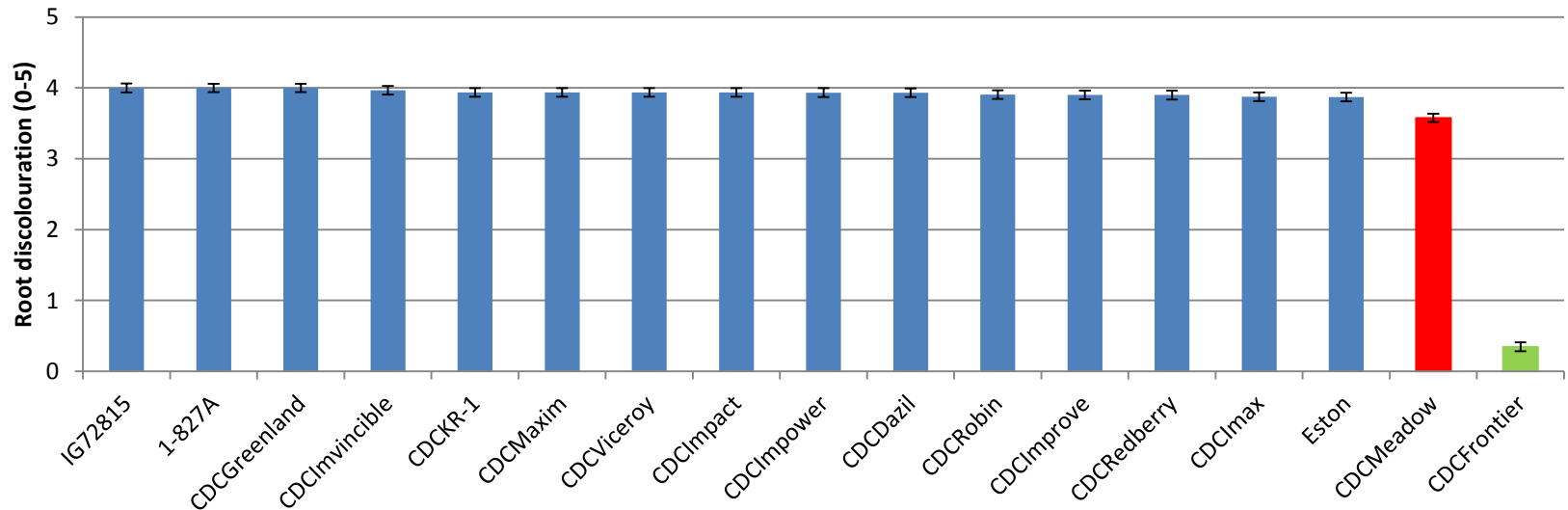
- First time reported in 2012 in Saskatchewan (and Alberta) in lentil fields
- Oospores survive in the soil up to 20 years
- Promoted by wet soils
- Produces motile zoospores





# Control options in lentil

- Chemical control ...  
No highly effective
- Crop rotation with non-hosts...  
4, 10, 20 years??
- No resistant lentil cultivars to *Aphanomyces euteiches*



**Aphanomyces root rot responses (measured as root discolouration) of cultivated lentil varieties in comparison to Lens ervoides accessions IG72815 and 1-827A, CDC Meadow pea and partially resistant chickpea variety CDC Frontier.**

## *Development of resistant cultivars*



### **Objective:**

To identify sources of resistance to *Aphanomyces euteiches* in wild lentil species

# Screening of *Aphanomyces euteiches* in wild lentil species

- 367 accessions (ICARDA)
  - Lens culinaris* ssp. *orientalis*
  - Lens culinaris* ssp. *tomentosus*
  - Lens culinaris* ssp. *odemensis*,
  - Lens ervoides*
  - Lens nigricans*
  - Lens lamottei*
- *A. euteiches* SK field isolate AE11  
(1000 zoospores mL<sup>-1</sup>, 5 mL plant)
- Susceptible lentil check CDC Proclaim



# Screening of *Aphanomyces euteiches* in wild lentil species

After 10 days of incubation

Rating scale

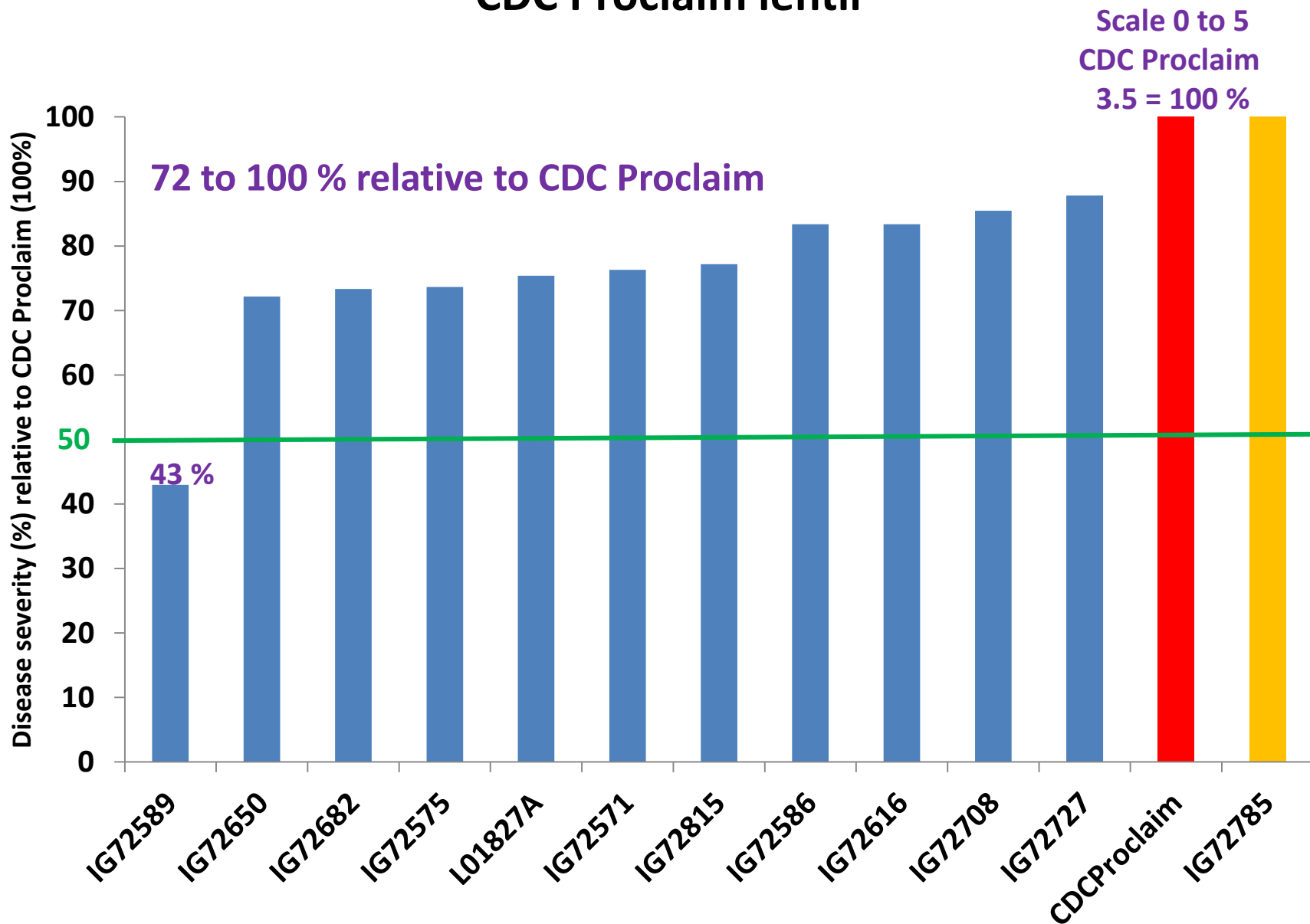
0 to 5 levels of root  
discolouration



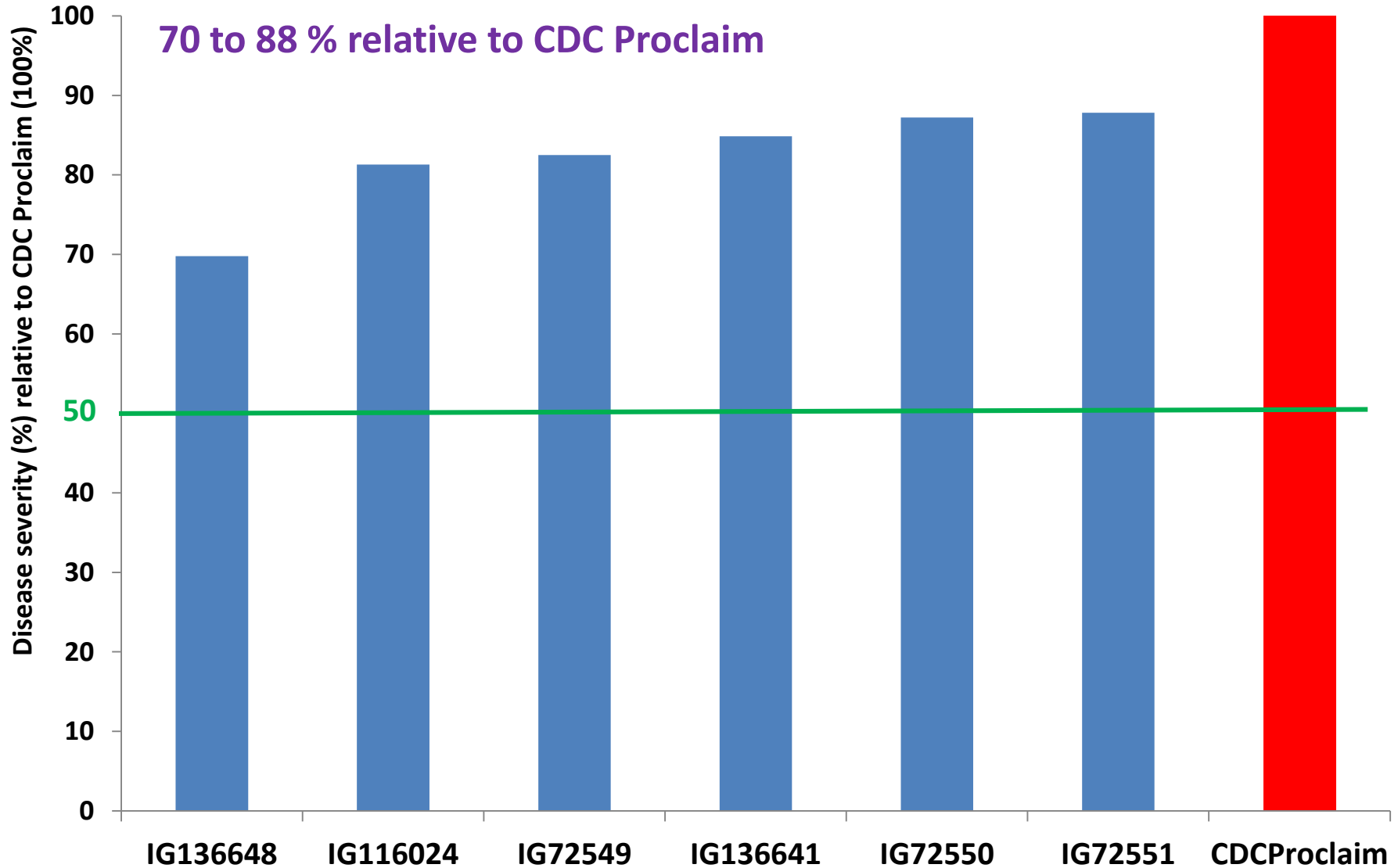
# Results



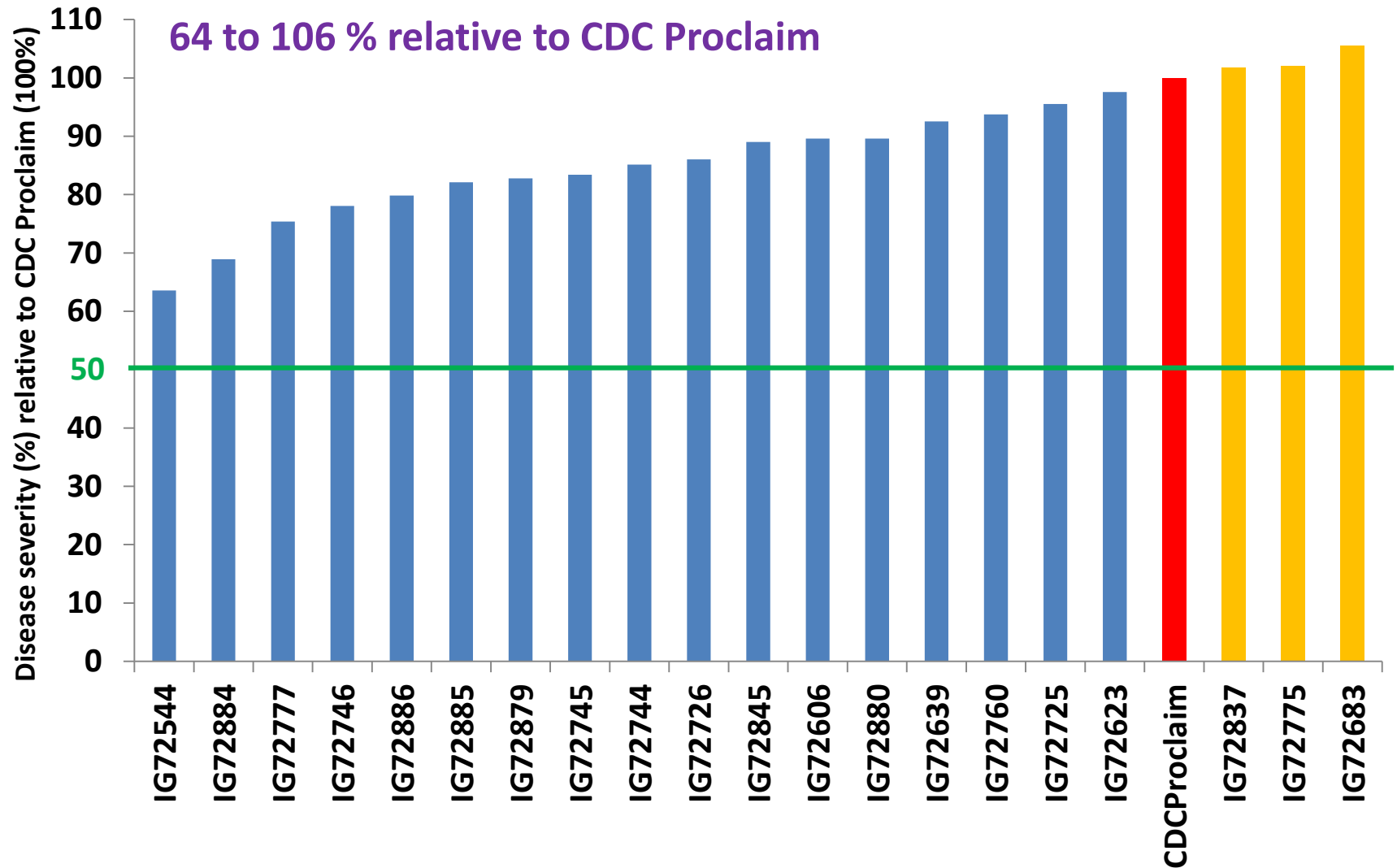
# Root rot severity on 12 accessions of *Lens ervoides* compared to CDC Proclaim lentil



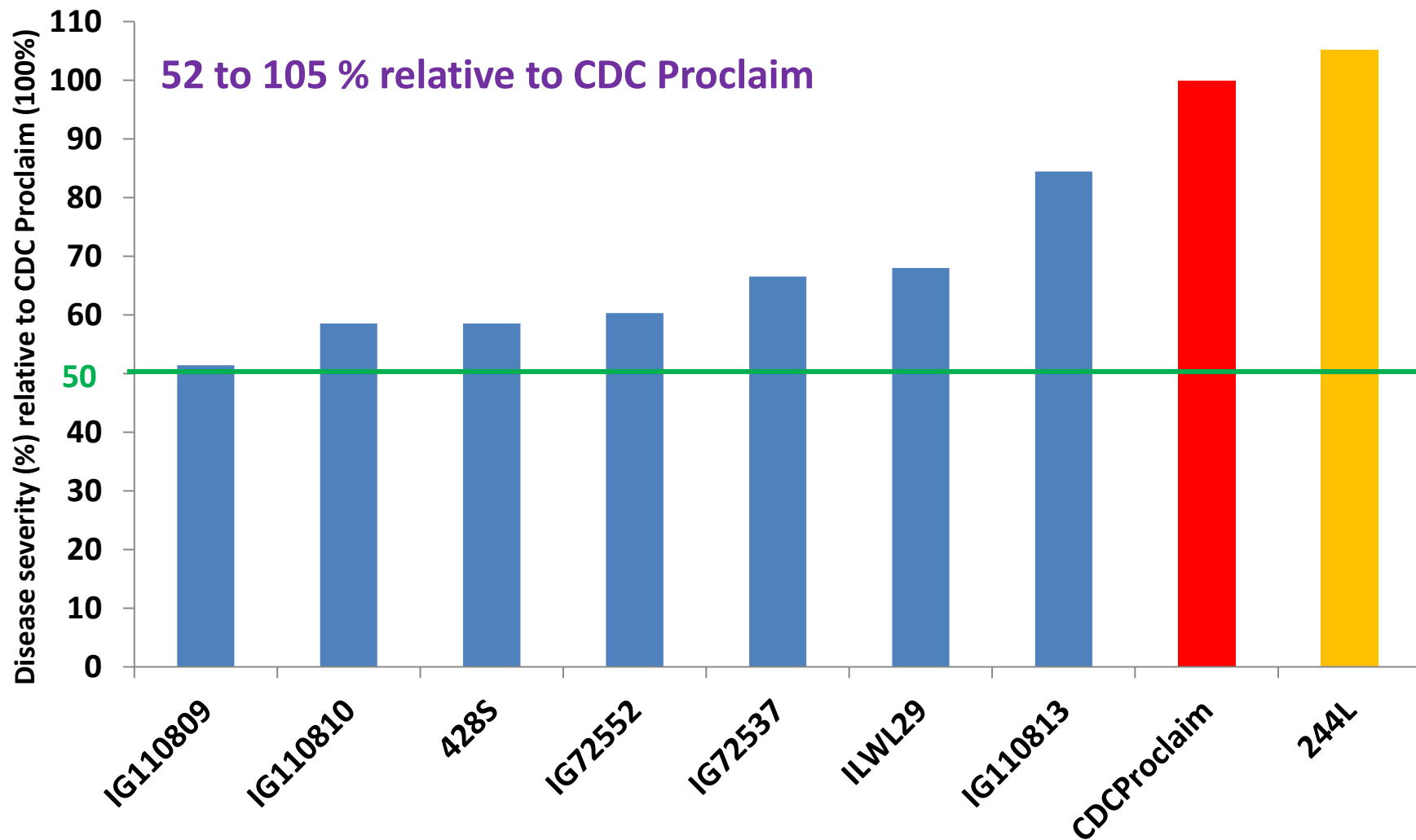
# Root rot severity on six accessions of *Lens nigricans* compared to CDC Proclaim lentil



# Root rot severity on 20 accessions of *Lens culinaris* spp. *odemensis* compared to CDC Proclaim lentil

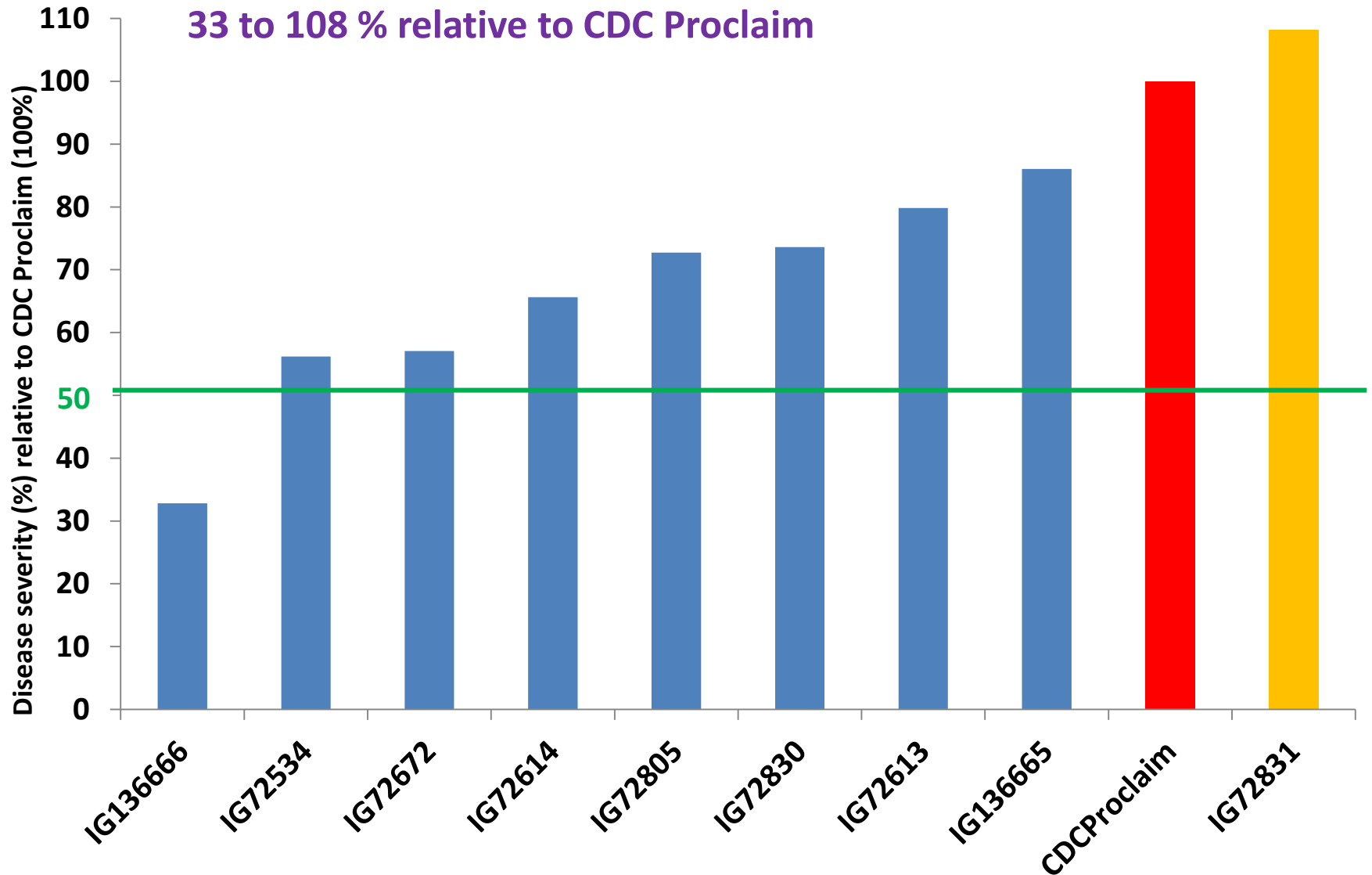


## Root rot severity on eight accessions of *Lens lamottei* compared to CDC Proclaim lentil

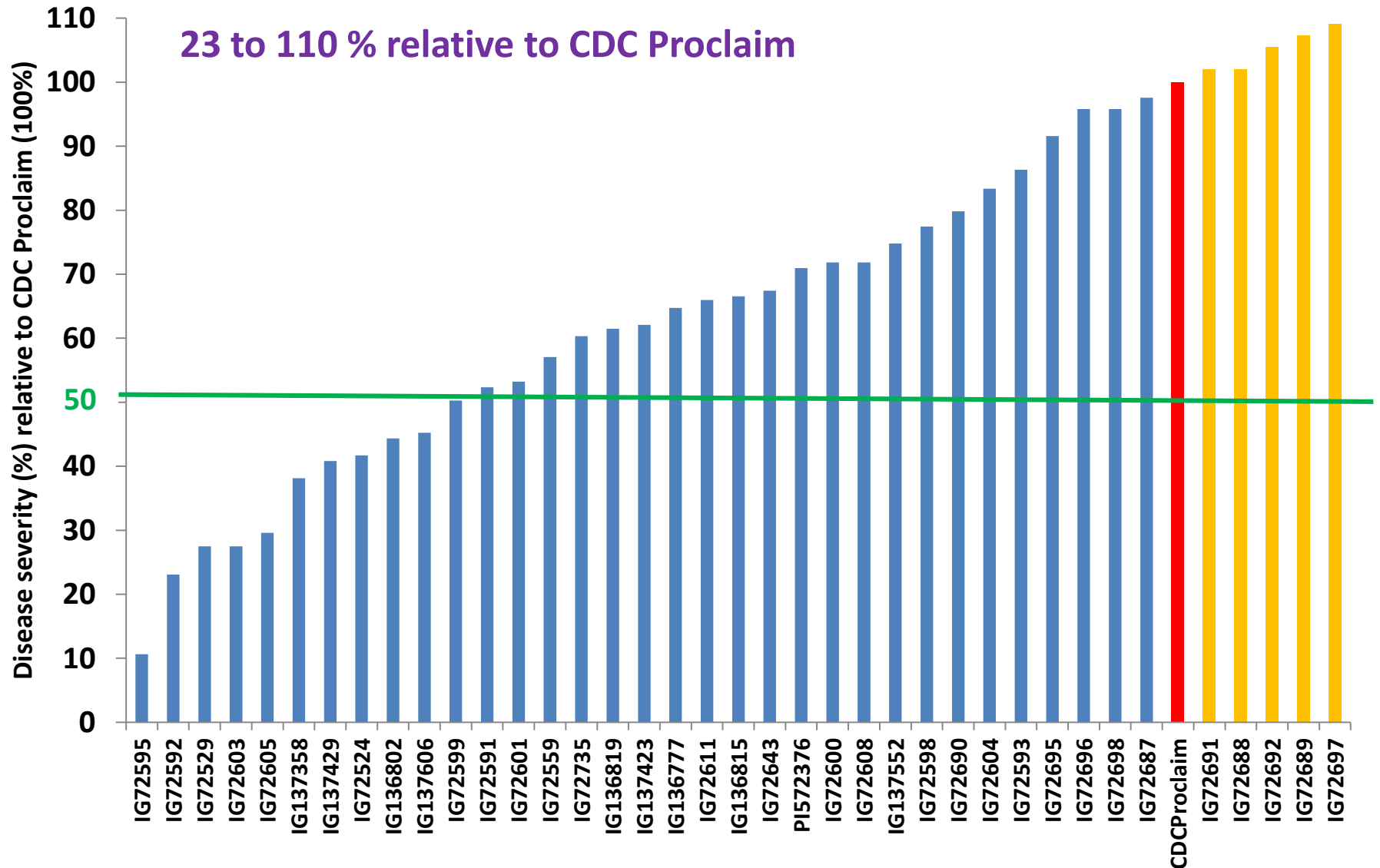




# Root rot severity on nine accessions of *Lens culinaris* spp. *tomentosus* compared to CDC Proclaim lentil



# Root rot severity on 38 accessions of *Lens culinaris* spp. *orientalis* compared to CDC Proclaim lentil



# Summary and conclusions

Species	Total screened	# of accessions with $\leq$ 50% of the CDC Proclaim disease score	Gene pool
<i>Lens culinaris</i> ssp. <i>orientalis</i>	38	11	Primary
<i>Lens culinaris</i> ssp. <i>tomentosus</i>	9	1	
<i>Lens culinaris</i> ssp. <i>odemensis</i>	20	0	Secondary
<i>Lens lamottei</i>	8	0	
<i>Lens ervoides</i>	12	1	Tertiary
<i>Lens nigricans</i>	6	0	Quaternary
Total	93	13	

- Closely related species (primary gene pool) can be easily crossed
- Crossing with distantly related species difficult

# Thanks



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